

## WHAT IS CLAIMED IS:

1. A detergent composition comprising a detergent ingredient, a pectate lyase enzyme and bleach system selected from the group consisting of a metal bleach catalyst; a combination of a peroxygen source and a bleach booster selected from the group consisting of zwitterionic imines, anionic imine polyions having a net negative charge of from -1 to -3, and/or mixtures thereof; a diacyl peroxide and/or mixtures thereof.
- 10 2. A detergent composition according to claim 1 wherein the metal bleach catalyst is selected from :  
(a) the  $[\text{Mn}(\text{Bcyclam})\text{Cl}_2]$  catalyst;  
(b) the cobalt catalyst having the formula  $\text{Co}[(\text{NH}_3)_n\text{M}_m\text{B}_b\text{T}_t\text{Q}_q\text{P}_p]\text{Y}_y$ ,  
wherein Cobalt is in the +3 oxidation from, n is an integer from 0 to 5,  
15 preferably 4-5, more preferably 5; M represents a monodentate ligand; m is  
an integer from 0-5, preferably 1 or 2, more preferably 1; B represents a  
bidentate ligant; b is an integer from 0-2; T represents a tridentate ligand; t is  
0 or 1; Q is a tetradentate ligand; q is 0 or 1; P is an pentadentate ligand; p  
is 0 or 1 and  $n+m+2b+3t+4q+5p=6$ ; Y is one or more appropriately selected  
20 counteranions present in a number y, where y is an integer from 1-3,  
preferably 2-3, more preferably 2 when Y is a -1 charged anion, to obtain a  
charge-balanced salt;  
(c) the cobalt catalyst having the formula  $[\text{Co}(\text{NH}_3)_5\text{M}]\text{T}_y$  wherein cobalt is  
in the +3 oxidation statte; M is a carboxylate-containing ligand having the  
fromula  $\text{RC(O)O}^-$ ; and T is one or more counteranions present in a number  
25 y, where y is an interger to obtain a charge-balanced salt (preferably from 1-  
3, more preferably 2 when T is a -1 charged anion);  
and/or mixtures thereof.
- 30 3. A detergent composition according to 1-2 comprising said metal bleach catalyst and further comprising a peroxygen source, preferably selected from the group consisting of a hydrogen peroxide source, a peroxyacid bleach precursor compound, and/or mixtures thereof.

4. A composition according to claims 2-3 wherein the metal bleach catalyst is present in an amount of from 1ppb to 10%, preferably from 0.1ppm to 1%, more preferably from 1ppm to 0.1% by weight of total composition.

5. A detergent composition according to any of the preceding claims wherein said diacyl peroxide is selected from the group consisting of dibenzoyl peroxide, benzoyl glutaryl peroxide, benzoyl succinyl peroxide, di(2-methyl benzoyl) peroxide, and/or mixtures thereof.

6. A detergent composition according to claim 5 wherein said diacyl peroxide is dibenzoyl peroxide.

10 7. A detergent composition according to any of the preceding claims wherein said diacyl peroxide is comprised in a particle; said particle comprising from 1-80% by weight of said particle of diacyl peroxide, from 0.01-95% by weight of said particle of a water soluble stabilising additive.

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a15 8. A detergent composition according to claim 7 wherein said stabilising additive is selected from the group consisting of alkali metal sulfates and citrates, ethoxylated C16-20 alcohols, polyethylene glycols melting above 100°F, maltodextrins, polyacrylate polymers and copolymers of molecular weight between 1.000 and 80.000, ethylene diamine tetra-acetates, ethylene diamine disuccinates and/or mixtures thereof.

20 9. A detergent composition according to claim 1-4 wherein said diacyl peroxide is dilauroyl peroxide.

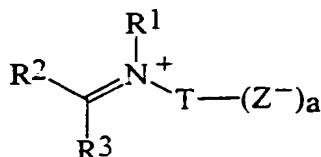
25 10. A detergent composition according to any of the preceding claims wherein said diacyl peroxide is comprised at a level of from 0.01% to 20% by weight of the composition, preferably 0.5% to 10%, more preferably 0.2% to 3%.

30 11. A detergent composition according to claims 7-10 wherein the diacyl peroxide is incorporated into a particulate and said particle is comprised at a level of from 0.1% to 30%, preferably from 1% to 15%, more preferably from 1.5% to 10% of the total composition.

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12. A detergent composition according to any of the preceding claims wherein said bleach booster is selected from the group consisting of aryliminium zwitterions, aryliminium polyions having a net negative charge of from -1 to -3; and/or mixtures thereof.

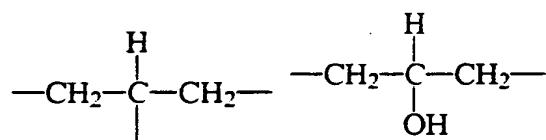
13. A detergent composition according to claim 12 wherein said bleach booster has the formula:



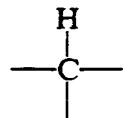
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wherein  $\text{R}^1$ - $\text{R}^3$  are moieties having a total charge of from about 0 to about -1;  $\text{R}^1$  and  $\text{R}^2$  form part of a common ring; T is selected from the group consisting of:  $-(\text{CH}_2)_b-$  wherein b is from about 1 to about 8,  $-\text{CH}(\text{R}^5)-$  wherein  $\text{R}^5$  is  $\text{C}_1\text{-C}_8$  alkyl,  $-\text{CH}_2(\text{C}_6\text{H}_4)-$ ,

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and  $-(\text{CH}_2)_d(\text{E})(\text{CH}_2)_f-$  wherein d is from 2 to 8, f is from 1 to 3 and E is - $\text{C}(\text{O})\text{O}-$ ,  $-\text{C}(\text{O})\text{NR}^6$  or :

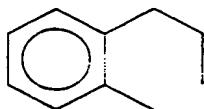


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- wherein  $\text{R}^6$  is H or  $\text{C}_1\text{-C}_4$  alkyl; Z is covalently bonded to T and Z is selected from the group consisting of  $-\text{CO}_2^-$ ,  $-\text{SO}_3^-$  and  $-\text{OSO}_3^-$  and a is either 1 or 2.

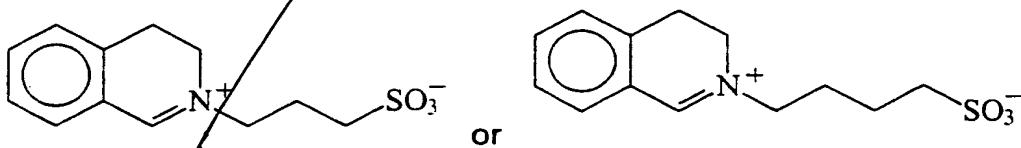
25 14. A detergent composition according to claims 12-13 wherein  $\text{R}^1$  and  $\text{R}^2$  together form the non-charged moiety:

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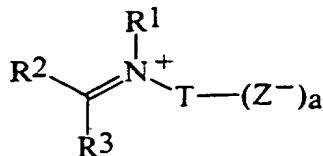


15. A detergent composition according to claims 12-14 wherein said bleach booster is an aryliminium zwitterion and R<sup>3</sup> is H, T is -(CH<sub>2</sub>)<sub>b</sub>- or -CH<sub>2</sub>(C<sub>6</sub>H<sub>4</sub>)-, Z is -SO<sub>3</sub><sup>-</sup>, a is 1 and b is from 2 to 4.

16. A detergent composition according to claims 12-15 wherein said bleach booster is an aryliminium zwitterion having the formula:

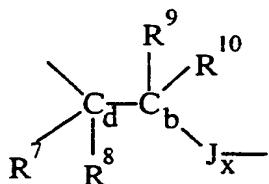


17. A detergent composition according to claim 12 wherein said bleach booster has the following formula:



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wherein R<sup>1</sup> - R<sup>3</sup> is hydrogen or an unsubstituted or substituted radical selected from the group consisting of phenyl, aryl, heterocyclic ring, alkyl and cycloalkyl radicals; R<sup>1</sup> and R<sup>2</sup> form part of a common ring; T has the formula:



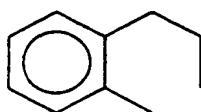
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wherein x is equal to 0 or 1; J, when present, is selected from the group consisting of -CR<sup>11</sup>R<sup>12</sup>-, -CR<sup>11</sup>R<sup>12</sup>CR<sup>13</sup>R<sup>14</sup>-, and -CR<sup>11</sup>R<sup>12</sup>CR<sup>13</sup>R<sup>14</sup>CR<sup>15</sup>R<sup>16</sup>-. R<sup>7</sup>-R<sup>16</sup> are selected from the group consisting of H, linear or branched C<sub>1</sub>-C<sub>18</sub> substituted or unsubstituted

alkyl, alkylene, oxyalkylene, aryl, substituted aryl, substituted arylcarbonyl groups, and amide groups; provided that at least one of R<sup>7</sup>-R<sup>8</sup> must be H or methyl, and that when neither R<sup>9</sup> nor R<sup>10</sup> is H, one of R<sup>7</sup>-R<sup>8</sup> must be H; Z is covalently bonded to J<sub>x</sub> when x is 1 and to C<sub>b</sub> when x is 0; and Z is selected from the group consisting of -CO<sub>2</sub><sup>-</sup>, -SO<sub>3</sub><sup>-</sup> and -OSO<sub>3</sub><sup>-</sup>, and a is 1.

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18. A detergent composition according to claim 17 wherein said bleach booster wherein R<sub>1</sub> and R<sub>2</sub> are defined in its formula as R<sub>1</sub> and R<sub>2</sub> together form the non-charged moiety:

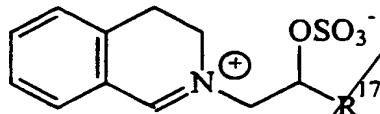
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19. A detergent composition according to claims 17-18 wherein said bleach booster is an aryliminium zwitterion and R<sup>3</sup> is H, Z is OSO<sub>3</sub><sup>-</sup>, a is 1.

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20. A detergent composition according to claims 17-19 wherein said bleach booster is an aryliminium zwitterion having the formula:



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where R<sup>17</sup> is selected from the group consisting of H and linear or branched C<sub>1</sub>-C<sub>18</sub> substituted or unsubstituted alkyl.

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21. A detergent composition according to any of the preceding claims wherein said bleach booster is comprised at a level of from 0.01% to 10% by weight of the total composition.

22. A detergent composition according to claims 12-21 wherein said peroxygen source is comprised at a level of from 0.01% to 60% by weight of the total composition.

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23. A detergent composition according to claims 12-22 wherein said peroxygen source comprises a preformed peracid compound selected from the group

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consisting of percarboxylic acids and salts, percarbonic acids and salts, perimidic acids and salts, peroxyomonosulfuric acids and salts, and/or mixtures thereof; a hydrogen peroxide source, a bleach activator and/or mixtures thereof.

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24. A detergent composition according to claim 23 wherein said hydrogen peroxide source is selected from the group consisting of perborate compounds, percarbonate compounds, perphosphate compounds and/or mixtures thereof.

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25. A detergent composition according to claim 23 wherein said bleach activator is selected from the group consisting of tetraacetylenediamine, sodium decanoxybenzene sulfonate, sodium nonanoxybenzene sulfonate, sodium octanoxybenzene sulfonate, (6-octanamido-caproyl)oxybenzenesulfonate, (6-nonanamido-caproyl)oxybenzenesulfonate, (6-decanamido-caproyl)oxybenzenesulfonate, and/or mixtures thereof.

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26. A detergent composition according to any of the preceding claims wherein said pectate lyase is present at a level of from 0.0001% to 2%, preferably from 0.0005% to 1.0, more preferably from 0.001% to 0.5% pure enzyme by weight of total composition.

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27. A detergent composition according to any of the preceding claims further comprising a pectin lyase.

28. Use of a composition according to any of the preceding claims for the removal of plant-, dirt-based stains, highly coloured food soils/stains and body soils.

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29. Use of a composition according to any of the preceding claims for superior fabric whiteness maintenance.

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30. Use of a composition according to claims 5-11 for effective highly coloured stains and soils removal on plasticware, and/or for preventing the staining and/or discolouration of the dishware by highly coloured components.

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